

WHAT IS CLAIMED IS:

1. An actuator comprising:

a laminated structure having a vibration plate,
a lower electrode, a piezoelectric element, and an
5 upper electrode laminated sequentially on a basic
element, wherein

at least said lower electrode of said two
electrodes is a thin oxide film of La-doped single
orientated crystal or monocrystal containing Sr and
10 Ti.
2. An actuator according to Claim 1, wherein
the piezoelectric element is a thin oxide piezo-
electrostrictive film of single orientated crystal or
15 monocrystal.
3. An actuator according to Claim 1, wherein
the La doping concentration in the electrode of thin
oxide film of single orientated crystal or
20 monocrystal is within a range of 0.05 atm% to 10 atm%
4. An actuator according to Claim 1, wherein
the lattice constant of the electrode of thin oxide
film of single orientated crystal or monocrystal is
25 within a range of 3.905Å to 4.030Å
5. An actuator according to Claim 1, wherein

the film thickness of the electrode of thin oxide film of single orientated crystal or monocrystal is within a range of 50 nm to 5,000 nm.

5 6. An actuator according to Claim 1, wherein the crystal orientation of the electrode of thin oxide film of single orientated crystal or monocrystal is either one of (010), (101), (110), and (111).

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7. An actuator according to Claim 1, wherein the crystal orientation ratio of the electrode of thin oxide film of single orientated crystal or monocrystal is 95% or more.

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8. An actuator according to Claim 1, wherein the piezoelectric element is a thin oxide piezo-electrostrictive film of single orientated crystal or monocrystal containing Pb, and at least either one of
20 Zr, Ti, Ni, Nb, Mg, Zn, and Sc.

9. An actuator according to Claim 8, wherein the crystal orientation ratio of the thin oxide piezo-electrostrictive film of single orientated
25 crystal or monocrystal is 90% or more.

10. An actuator according to Claim 8, wherein

the crystalline system of the thin oxide piezo-electrostrictive film of single orientated crystal or monocrystal is rhombohedral or tetragonal.

5 11. An actuator according to Claim 8, wherein
the film thickness of the thin oxide piezo-electrostrictive film of single orientated crystal or monocrystal is 500 nm or more and 10 μm or less.

10 12. A liquid discharge head provided with a main body portion having the actuator according to Claim 1, and pressure chamber formed with opening portion on a part thereof, and communicated with liquid discharge port, wherein said actuator is
15 provided on said pressure chamber so as to close said opening portion.

13. A liquid discharge head provided with a main body portion having the pressure chamber
20 communicated with liquid discharge port, and an actuator provided on said main body portion corresponding to said pressure chamber, wherein
 said actuator comprises a laminated structure having a vibration plate, a lower electrode, a
25 piezoelectric element, and an upper electrode laminated sequentially on said main body portion, and at least said lower electrode of said two electrodes

is a thin oxide film doped with La of single orientated crystal or monocrystal containing Sr and Ti.

- 5 14. A method for manufacturing a liquid discharge head provided with the main body portion having pressure chamber communicated with liquid discharge port, and an actuator provided on said main body portion corresponding to said pressure chamber,
- 10 comprising the following steps of:
 - filming a vibration plate on said main body portion;
 - filming on said vibration plate a lower electrode of thin oxide film of single orientated
 - 15 crystal or monocrystal containing La doped Sr and Ti;
 - filming on said lower electrode a perovskite type thin oxide piezo-electrostrictive film
 - filming an upper electrode on said perovskite type thin oxide piezo-electrostrictive film;
 - 20 and forming said pressure chamber.